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ABSTRACT

This paper explores the issue of how, when, and where to teach keyboarding at the elementary school level through a review of the keyboarding literature and descriptions of three studies conducted with fifth grade students in the laboratory school at the University of Wyoming. The literature review briefly summarizes findings on the following topics: (1) when keyboarding skills can be taught; (2) whether motor proficiency affects the ability to acquire keyboarding skills; (3) whether formal keyboarding instruction improves elementary students' keyboarding skills; (4) the effect of keyboarding on student achievement in other subject areas; and (5) the students' attitudes toward learning keyboard skills. The three studies conducted at the University School are then described. The first involved observation of students learning keyboarding with a personal typing book and progressing at their own rate. The second study compared the achievement of two groups learning keyboarding using the traditional typing text and individualized instruction; one group used Apple microcomputers and the other used typewriters. The third study investigated whether students who had completed a nine-week keyboarding class would produce longer stories using a computer than students who had no formal keyboarding instruction. It was found that elementary students showed positive attitudes toward keyboarding activities, learned to keyboard through formal instruction, and showed some improvements in language arts achievement as a result of participation in keyboarding activities. (RP)

KEYBOARDING ISSUES IN ELEMENTARY EDUCATION: SOME RESEARCH FINDINGS

by

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INTRODUCTION

With the advent of the microchip the United States, as well as the world, has experienced a revolution that is unsurpassed. The impact of microcomputers on education is tremendous and will continue to have an impact which is restructuring modern life. Many authors compare the arrivial of computer technology to the arrival of speech, the arrival of writing, and the invention of printing.

Business and personal users are buying microcomputers at a surprising rate. Limited funding is probably the main reason educational institutions are not buying more microcomputers. It is estimated that there are 1.22 micros in every school in the United States; however, with the increase of the purchase of computers for the home most students, no doubt, use computers.

Because of the exp nding use of microcomputers in the school and home, there is growing concern over how/when/where to teach keyboarding at all levels of education. Should elementary school students who are going to be using computers have instruction in keyboarding skills? Currently, the keyboard is the main way of "communicating with" microcomputers. Many educational applications require a considerable amount of user input via the keyboard. Thus, a number of professionals have expressed opinions favoring the introduction of keyboarding skills at this level. They stress that efficient keyboarding skills can make the computer a more effective tool.

REVIEW OF LITERATURE

An extensive review of the elementary keyboarding literature revealed that there are many opinions, a few research studies, and several "typewriting" studies that are relevant to the topic. Some pertinent questions are briefly summarized below.

When Can Keyboarding Skills Be Taught?

Improvement in keyboarding speeds as a result of direct instruction has been reported for students as young as five [1] continuing through students in grade six [2,3]. Based on her work with very young children, Cowles states that keyboarding instruction is more appropriate for students who can read [1]. She reported averages of 18 gwpm for five and six year-olds. However, these timings are for words made only from homerow keys and can not be compared directly to other reported timings. Seven and eight year-olds averaged 9 to 11 gwpm after nineteen days of instruction. Intermediate grade students can successfully learn keyboarding skills. After nine weeks of daily instruction fifth graders were averaging 20 gwpm [3] and after one year of daily instruction and practice fifth and sixth graders were averaging 40 gwpm [2]. Additionally, a general trend toward increase in typing speed as age increases can be identified [1-5].

Does Motor Proficiency Affect Ability to Acquire Keyboarding Skills?

The little evidence available seems to indicate a relationship between motor proficiency and acquired keyboarding skills. Significant correlations between fine motor skills and typing performance for seven and eight year-olds but not for five and six year-olds have been found [1]. Students who scored high on the WISC digit span benefited more from the use of typewriters [6]. Likewise, data exists to support the inference that the typewriter is a more functional tool for work production in Language Arts for high motor dexterity subjects than for low dexterity subjects [7].

Does Formal Keyboarding Instruction Improve Elementary Students' Keyboarding Skills?

The answer seems to be yes. Students who had no formal instruction but

who had equivalent time working at the typewriter consistently typed at slower rates than those who received formal instruction. Rates for the "no formal instruction group" ranged from four to ten gross words per minute [4,6-9] while rates for the formal instruction group ranged from 9 to 40 gwpm [1-3]. Among the groups receiving formal instruction, the amount of time spent in formal instruction seemed to be directly related to performance [1-3].

What Is the Effect of Keyboarding on Student Achievement in Other Subject Areas?

Research where experimental students integrated the use of typewriters into other academic areas and where no formal keyboarding instruction was given reported small positive gains in favor of the typing group in language arts [4,6-9]. Gains in spelling [3] and increased production of written material for class assignments [7] have been noted for experimental students using touch typing techniques with applications in language arts.

Studies investigating variations of the "talking typewriter" indicate that experimental subjects perform at higher levels than students from comparable backgrounds [10-12]. However, these gains are impossible to separate from the total "learning booth" approach. Experimenters felt that the talking typewriter was an integral part of the treatment. An examination of this treatment, particularly the exploratory and matching phases reveals that the 'hunting' aspect of keyboarding may be an important facet of this treatment.

What Were Students Attitudes Toward Learning Keyboard Skills?

The studies uniformly reported increased student motivation and positive attitudes by students who were working with the keyboards, whether it was in direct keyboarding instruction or in related curricular writing (keyboarding) projects.

Does Teaching Keyboarding Skills Enhance Elementary School Students Ability to Effectively Use the Computer?

No studies were located which investigated this question.

RESEARCH AT UNIVERSITY SCHOOL

Background Information

Educators at University School recognized the need for keyboarding instruction several years ago when computers were first used in the school. Seventh grade students are given first priority when students are scheduled into the typewriting class. Students are required to learn the letter, number, and symbol keys by the touch method before they can enroll in 7-9th grade computer classes.

During the 1982-83 school year, the faculty of the Laboratory School also saw the need to teach keyboarding in the fifth grade since a computer class was being taught in the sixth grade. The first class began in the fall of 1983. One-half of the fifth grade class took keyboarding the first nine weeks in fall; the other half, the last nine weeks in spring. The class was individualized with students progressing at their own rate. The students were guided through the lessons by the instructor, and careful attention was given to the use of proper techniques. A personal typing book which had clear instructions and illustrations to help the visual learner was used. Evaluation of work was done according to accepted standards.

Observation

Not many students experienced difficulty in following instructions. They also had no difficulty in learning the keyboard by touch. There was no greater

propensity to watch fingers than in the typing class. Fifth graders are eager learners; they are accurate and hate to make mistakes!

The length of the keyboarding period was 40 minutes. This length of time tired some pupils; therefore, students were allowed to "rest" mid-way through the period.

Progress of the students varied from four lessons (one-half the letter keys) to 33 (all of the letter keys, seven reinforcement lessons, all the figure keys, plus some symbol keys). Progress was slowed because of absences, ability, time on task, or special needs students. The girls progressed faster than the boys, which might be expected because of the difference in maturity. Girls generally kept "on task" the whole period.

Gross words per minute (gwpm) varied from 9 to 33 on one-minute timed writings for an average of 20 gwpm. Again, girls gained the higher speeds. In the first class the gwpm difference between boys and girls was two gwpm, in the second and third classes the spread was five gwam. Students that took three-minute timed writings averaged 16 gwpm.

Comparative Keyboarding Studies: Microcomputer and Typewriter

Typing Text

In the spring of 1985, computers were used in the keyboarding class. Twelve fifth-grade students were grouped by sex and randomly selected for the keyboarding class. These students were again grouped by sex and randomly assigned to an Apple computer group and a typewriter group. Both groups shared the classroom at the same time. The groups used the traditional typing text which had been used previously, and instruction was individualized.

Students using the computers completed an average of 21.6 lessons. The boys finished an average of 21.3 lessons. The girls averaged 22 lessons. The average gross words per minute (gwpm) was 16.3 on one-minute timed writings for the boys,

18.3 for the girls, and 17.3 for the group. On three-minute writings, the average was 16.6 gwpm for the girls, 15.5 for the boys, and 16.2 for the group. Individual speeds ranged from 13 to 22 gwpm for the group on the one-minute writings, and from 12 to 19 on the three-minute writings.

The group using the typewriters completed an average of 26.1 lessons. The range was from 14-32 lessons. Boys averaged 23.6 lessons; and girls, 27.6. One-minute timed writing averages were: 16 gwpm for the boys, 19.6 gwpm for the girls, and 17.8 gwpm for the group. The averages for the three-minute writings were: 17.3 gwpm for the girls; 15.6, boys; and 16.5, group. The range of gwpm on one-minute writings was 10-29, and on the three-minute writings, it was 10-29. The range was 9-25 gwpm.

Keyboarding Text

For fall, 1985, the fifth-grade keyboarding class was grouped by sex, and students were assigned to the class using a random number table. Those assigned to the class were again grouped according to sex and then randomly assigned to Apple computers or typewriters. Keyboarding texts were used for both groups. Lessons in the keyboarding text were approximately the same lengthlas those in the traditional text.

The typewriter group finished an average of 19.3 lessons with a range of 9 through 27, which completed the book. Boys completed an average of 21.6 lessons and girls completed an average of 17. Gross words per minute (gwpm) on one-minute writings were 16 for the boys, 13.6 for the girls, with an average of 14.8 for the group.

In the computer group, boys completed an average of 16.2 lessons, girls an average of 24.2 lessons, with a group average of 19 lessons. The one-minute timed writing average for lthe girls was 16.5; for the boys, 17.5, and for the

group, 17.2. The range for this group was 11-34 gwpm. Three-minute writings were not given to this class. Four students finished the book in seven weeks; two in each group. These students then did other production work. In each class, reaches to the number keys were practiced during the last period of class.

Comparative Study: Keyboarding for Language Arts Composition

The purpose of this comparison was to investigate whether students wno had completed a nine-week keyboarding class would produce longer stories using a computer than students who had not had formal keyboarding instruction. Twenty-four fifth grade students were randomly assigned to either the keyboarding instruction group or the control group. The keyboarding group received a nir. week keyboarding class while the control group participated in a Spanish class.

Phase two began after the keyboarding instruction was complete. During the tenth week, all students met to discuss writing a branching story. Several "choose your own" adventure books were available for students to examine. Next, a brainstorming session was held where all students could suggest ideas for possible branching stories. Each student made a brief outline using index cards, outlining the major events and choices that would be offered in the story. Third, all students were introduced to the program Story Tree . Students read three prepared selections using the Story Tree and learned how to enter pages to their story. The following three weeks were devoted to students typing in their stories. Each student worked at a computer for 45 minutes two times a week.

Each student's story was printed out and the number of words were

counted. A multiple regression analysis was completed using the students' output, students' language arts achievement scores, and sex as factors. The regression coefficient was statistically significant ($p<.05$). Examination of the factors revealed that the most important factor was the students' language arts achievement ($p<.05$), keyboarding was a contributing factor but was not statistically significant ($p>.05$) and sex was not a contributing factor.

Observations of student behaviors during the task revealed that as much as 50 percent of students' time was spent thinking about what they were going to write. Entering the story line occupied approximately 30 percent of students' time with the remainder being divided between discussing stories with others and correcting mistakes. Further research studies investigating the time spent correcting typing errors by individual students would be beneficial for determining the impact of keyboarding instruction. Since this was the students first attempt at writing a branching story and using the computer program Story Tree it would be useful to collect data over a longer period of time to study the enhancing effects of keyboarding instruction.

SUMMARY

Elementary students show positivie attitudes toward keyboarding activities, can learn to keyboard through formal instruction, and show some improvements in language arts achievement as a result of participation in keyboarding activities.

Fifth-grade students do well with the touch method of keyboarding. Classes taught during 1983-84 used the IBM typewriter. Students averaged 20 gwpm on one-minute timed writings. They averaged 16 gwpm on three-minute timed writings. Computers and typewriters were used for the spring 1985 keyboarding class. Students using the computers averaged 17.3 gwpm on one-minute timed writings and 16.2 gwpm on the three-minute timed writings. Both these classes used a

traditional text. A keyboarding text was used for the fall 1985 class. This class also used computers and typewriters. The average for the group using computers was 17.2 gwpm on the one-minute timed writings. The typewriter group had an average of 14.8 on the one-minute timed writings.

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A more comprehensive review of this literature and an extensive bibliography is available from Pat McClurg, College of Education, U.of Wyoming, Laramie, WY,